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<b>(21) International Application Number:</b> PCT/SE90/00641 <b>(22) International Filing Date:</b> 4 October 1990 (04.10.90)  <b>(30) Priority data:</b> 8903297-3                      6 October 1989 (06.10.89)                      SE  <b>(71)(72) Applicant and Inventor:</b> VALDEMARSSON, Lars [SE/SE]; PL. 7026, S-524 00 Herrljunga (SE).  <b>(74) Agent:</b> ÖRTENBLAD, Bertil; Noréns Patentbyrå AB, Box 27034, S-102 51 Stockholm (SE).  <b>(81) Designated States:</b> AT (European patent), BE (European patent), CH (European patent), DE (European patent), DK (European patent), ES (European patent), FI, FR (European patent), GB (European patent), IT (European patent), JP, LU (European patent), NL (European patent), NO, SE (European patent), SU, US.		<b>Published</b> <i>With international search report.</i> <i>In English translation (filed in Swedish).</i>
<b>(54) Title:</b> A METHOD AND APPARATUS FOR FACILITATING MEDICATION  <div data-bbox="779 1260 1039 1680"></div> <b>(57) Abstract</b> <p>A method for facilitating medication, in which medicine corresponding to the medicine to be ingested by a patient at given respective times is placed in series of containers which form mutually sequential and mutually separated spaces, each space being caused to contain the medicine to be ingested at a given time. The invention is characterized in that the series of containers is caused to be inserted into a dispensing arrangement of a kind which dispenses one container at a time, and in that the dispensing arrangement (6) is caused to dispense one container (1) at a time at given points of time, under the influence of a clock and a drive means (10-15, 20). The invention also relates to an apparatus.</p>		

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## A method and apparatus for facilitating medication

The present invention relates to a method and to an apparatus for facilitating medication.

5

Many people have difficulty in remembering to take the correct medicine or drug at the correct time, particularly older people and handicapped people. To facilitate such medication, there is known an apparatus which includes a large number of compartments with the intention that the patient removes one or several different medicines or drugs from their respective packages and places the correct dosage of each medicine in a compartment intended therefor. For instance, the apparatus can include 21 compartments, corresponding to three compartments for each day of the week. The patient thus portions out the medicine so as to suffice for a full week. The patient is able to see from the apparatus whether he or she has taken the medicine from a compartment pertaining to a given time.

10

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However, despite the facilities afforded by such an apparatus, many people forget to take their medicine. Furthermore, many people are unable to divide their medicines or drugs into the correct dosages for the correct compartment.

20

The present invention relates to an apparatus which greatly facilitates the correct medication of a patient. According to one preferred embodiment of the apparatus, the patient is also reminded to take his/her medicine.

25

The present invention thus relates to a method for facilitating medication, where medicine corresponding to the ingestion of a patient's medicine at given time points is placed in a series of containers which form mutually separated and mutually sequential spaces, wherein each space is caused to contain the medicine dosage to be ingested at a given time, and is characterized in that said series of containers is caused to be inserted into a dispensing arrangement of a kind which dispenses one container at a time; and in that said dispensing arrangement is caused to dispense one container at a time at given times under the influence of a clock and a drive means.

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35

The invention also relates to an apparatus of the kind having the main characteristic features set forth in Claim 7.

- 5 The invention will now be described in more detail partly with reference to the accompanying drawings which illustrate exemplifying embodiments of the invention and in which
- Figure 1 is a sectional view of a stack of mugs;
  - Figure 2 illustrates a casing;
  - 10 - Figure 3 is a sectional view of a dispensing arrangement according to a first embodiment of the invention;
  - Figure 4 is a sectional view taken on the line A-A in Figure 3;
  - Figure 5 is a sectional view taken on the B-B in Figure 3;
  - Figure 6 is a block schematic of a control circuit;
  - 15 - Figure 7 is a sectional view of a dispensing arrangement according to a second embodiment.

Figures 1-6 illustrate a first embodiment of the inventive apparatus and a first embodiment of the inventive method will be described  
20 herebelow with reference to these Figures.

Figure 7 illustrates a second embodiment of the inventive apparatus and this apparatus is described herebelow with reference to said  
25 Figure.

Common to these embodiments is a method and an apparatus for facilitating medication, where medicine, or drugs, corresponding to an ordained ingestion of medicine at given respective times is placed in a series of containers which form mutually sequential and mutually  
30 spaced spaces, wherein each space is caused to contain the dosage prescribed for ingestion at a given time. The containers are caused to be inserted in a dispensing arrangement of a kind which functions to dispense one container at a time. The dispensing arrangement 6;  
106 is caused to dispense one container 1; 101 at a time and at  
35 determined times, through the influence of a clock and a drive means 10-15, 20;113.

Figure 1 illustrates part of an inventive apparatus according to the

first embodiment. The apparatus includes a plurality of known, stackable mugs 1. In a stack 2 of mugs 1, a space 3 is formed between each two mutually stacked mugs 1, of which only one space 3 is shown in Figure 1. The medicine is intended to be located in the spaces 3.

5

The mugs 1 may be of any suitable known kind. The mugs are preferably plastic disposable mugs configured so as to enable them to be used together with a mug dispensing arrangement.

10 The apparatus also includes a suitable casing 4 which is intended to embrace a mug stack 2, and therewith also the medicine placed between the mugs. The casing is primarily intended as a mug packaging means, subsequent to having placed the medicine in the mugs and the mugs stacked, until the mugs are to be used for dispensing medicine. The  
15 casing may be formed in different ways. According to one embodiment, the casing is tubular and is provided with a lid 5 at one or both ends thereof. The casing may also be formed from shrink plastic which is applied subsequent to having placed the medicine in the mugs and stacking said mugs.

20

The inventive apparatus also includes a mug dispensing arrangement 6, illustrated in Figures 2-6, which functions to dispense one mug at a time. The mug dispensing arrangement illustrated in Figures 3-5 is of a known kind, and is therefore only described summarily in the  
25 following.

The mug dispensing arrangement includes a housing 10, a mug holder 11, a latching apparatus in the form of a fork 12, and a drive means 13 which drives the latching device 12. The drive means includes an  
30 electric motor 14 and an excentric 15. When the motor 14 drives, the fork 12 is moved reciprocatingly by means of the excentric 15.

The mug dispensing arrangement is provided with a flap 16, which is opened when inserting a stack of mugs into the apparatus, the lowermost  
35 mug in the stack being positioned in that part of the apparatus identified by the reference numeral 17. Although not shown, it is preferred that the flap can be locked with the aid of suitable locking means, so that the patient is denied access to the medicine within

the apparatus.

When a stack of mugs is inserted, the lowermost mug rests on the fork 12, as illustrated in Figure 1. When the motor 14 receives an impulse to dispense a mug, the fork is withdrawn in its own plane, i.e. to the right in Figure 3, whereupon the lowermost mug drops slightly to a position in which it can be removed. The fork herewith returns to its forwardly displaced position, where it lies in abutment with the mug which lay next in line to the last-mentioned mug in said stack.

Thus, according to the present method medicine corresponding to a prescribed dosage for ingestion at respective time points is placed in the stackable mugs. This is appropriately done at the chemist shop or by hospital personnel or the like. Subsequent to placing the medicine in the mugs and stacking the mugs together, the casing 4 is fitted over the mug stack. The casing is intended to be removed at a later stage and the mugs inserted into the mug dispensing arrangement.

However, the patient need not be concerned with the dosage of different medicines prescribed for ingestion at different times, since each mug will contain the medicine dosage applicable for that particular time.

The mug dispensing arrangement includes a control circuit which includes a clock and which is intended to control the dispensing arrangement so that one mug is dispensed at a time at determined times.

Figure 6 illustrates an example of one such control circuit. In one preferred embodiment there is included a processor 20 which is programmed to carry out the following functions, in a conventional manner. The processor is programmed to sense real time. Connected to the processor is a motor control circuit 21 by means of which the processor controls the motor to carry out a sequence in which the fork 12 is moved reciprocatingly. Also connected to the processor is a PROM-memory 22 and a RAM-memory 23, the PROM-memory containing the software and the ROM-memory is used to store temporary information.



For the purpose of detecting whether or not the patient has taken a dispensed mug within a given predetermined length of time, the arrangement includes a sensor in the form of a microswitch or photocell 24, 25 positioned in the space 26 in which a dispensed mug occupies its collecting position.

According to one preferred embodiment, the casing 4 is provided with a machine-readable code, preferably a bar code 7, containing information as to the times at which the patient shall ingest the medicines prescribed.

In this respect, it is preferred that the control circuit of the mug dispensing arrangement is constructed to be programmed with said times by reading the machine-readable code with the aid of an optical reader, preferably a so-called pen reader 8, belonging to the dispensing arrangement. The information read-off and stored in the RAM-memory is thus used by the processor to activate the motor control circuit 21 at the correct times.

In the case of this embodiment, it is intended that a nurse or like attendant will read the bar code with the aid of the pen reader and thereafter remove the stack of mugs from the casing and insert the stack into the medication apparatus. The flap 16 is then locked. Subsequent to having read-off the bar code, the processor begins the functions described above and the functions described below.

In the case of the second embodiment of the invention, the aforesaid series of containers has the form of a strip of mutually sequential bags 101, with each bag being caused to contain the prescribed medicine dosage for ingestion at a given time. The strip of bags is inserted into a dispensing arrangement of a kind in which one bag 101 at a time is separated from the strip and dispensed.

This second embodiment of the invention is described schematically herebelow insomuch that the dispensing arrangement is described with respect to those parts which differ from the aforescribed dispensing arrangement. In other respects, the dispensing arrangement corresponds functionally to the dispensing arrangement described with reference

to the first embodiment.

The arrangement includes a casing 131 within which a shelf 132 is provided for supporting a strip of bags 101. The casing 131 can be opened and is hinged by means of a hinge 140 along the broken line 141. The arrangement includes two soft rollers 104 which are driven by means of an electric motor, not shown. The rollers are preferably made of foamed rubber, so as not to damage the contents of the bags 101 while achieving satisfactory driving of the bag strip at the same time. The rollers are driven in the directions of the arrows 133. The arrangement further includes a drive unit 114, comprising an electric motor 113 which is intended to drive a disc 134 on which a cutting device 115 is excentrically mounted. When the disc 134 rotates through one revolution, the cutting device is moved from the position illustrated in Figure 7 to a position immediately above an edge 135, wherewith coaction between the edge 135 and the underside of the cutting device separates a bag from the bag strip. The cutting device then returns to the position illustrated in Figure 7. The separated bag slides down onto a plate 136, to a collecting position identified by the reference numeral 137. The reference numeral 125 identifies a photocell which functions to detect whether or not a bag 101 occupies the collecting position.

When inserting a fresh strip, the strip is detected by means of a photocell 138, wherewith a signal produced by the photocell initiates driving of the rollers 104, via the control circuit 20, until the foremost bag in the strip occupies the position 139 illustrated in Figure 7. This position is sensed by means of an optical read device 108 of the kind intended for reading a machine-readable code, preferably a bar code.

According to this embodiment, the bags are namely provided with a machine-readable code, preferably a bar code, containing information concerning the times at which the patient shall ingest the medicines.

Subsequent to reading-off this information, the time at which medicine shall be dispensed is stored in the processor 20. The processor comprises a real time clock. At the time when medicine shall be

taken, the processor 20 activates the rollers 104 to their driving mode, so that the rollers advance the bag strip until the next bag in line is located in the position 139 shown in Figure 7. The processor then activates the motor 113, so that the cutting device separates the first bag from the remainder of the strip. The bags are suitably positioned so that the bag separating line is located slightly below the partition wall between the first and the second bags, such that the upper edge of the separated bag will be open. This makes it unnecessary for the patient to open the bag. The machine-readable code on the bag advanced to position 139 is read suitably as the bag is advanced. The read device 108 may suitably consist of a device corresponding to a pen reader.

It is obvious that the control circuit which functions to control the dispensing arrangement according to the second embodiment of the invention can be configured in a manner corresponding to the control circuit illustrated in Figure 6.

The arrangement can include batteries 142 as a back-up power supply in the event of a faulty mains.

A common features of both embodiments is that when the processor has activated the motor or motors so that a container is dispensed, the processor is programmed so as to produce an acoustic and/or light signal through a device 27 of suitable known kind, so as to draw the attention of the patient to the fact that a medicine container has been dispensed. The processor is also constructed to count the time from the dispensing of a container to the time at which the transducer 25, 26; 125 indicates that the patient has removed the container. If the container has not been removed within a predetermined length of time, for instance 5 minutes, the processor is constructed to produce an alarm signal.

According to one preferred embodiment, the apparatus includes a telephone modem 28 with associated number transmitter, and the processor is constructed to activate the telephone modem by producing said alarm signal. The number transmitter is preferably of the kind used in burglar alarm installations. The number transmitter is prefer-

ably arranged to ring an alarm centre. This may either be located within the building in which the apparatus is found, or in some other location. When the apparatus is used, for instance, within a service (care) building, the use of the number transmitter can be dispensed  
5 with, since conductors can be drawn instead to a service office where personnel are in attendance.

According to one embodiment, devices such as a fire alarm 29 and/or a microphone 30 may also be connected to the apparatus. These devices  
10 are intended to deliver to the processor a signal which activates the number transmitter in response thereto. The microphone is intended to detect sound, such as a cry or shout, or sound from a whistle, rendered or blown by a patient in need. This supplementation of the facilities afforded by the apparatus described in the foregoing  
15 provides a combination of a medication apparatus and a patient monitoring apparatus.

It is evident from the foregoing that the present invention solves the aforementioned problems and provides a simple and reliable method  
20 and an apparatus of simple construction.

It will also be obvious that modifications can be made to the illustrated embodiment. For instance, the dispensing arrangement can be configured in some other way, as can also the containers, and that  
25 these modifications lie within the normal competence of the skilled person.

The present invention is thus not restricted to the aforescribed embodiments, since these embodiments can be modified within the scope  
30 of the following claims.

## CLAIMS

1. A method for facilitating medication in which medicine corresponding  
5 to the medicine ingestion of a patient at given respective times is  
placed in a series of containers forming mutually sequential and  
mutually separate spaces, wherein each space is caused to contain the  
medicine to be ingested at a given time point, c h a r a c t e r i z  
e d by inserting said series of containers (1; 101) into a dispensing  
10 arrangement of the kind which dispenses one container at a time; and  
by causing said dispensing arrangement (6; 106), to dispense one  
container (1; 101) at a time at given times under the influence of a  
clock and a driven means (10-15, 20; 104, 114).
- 15 2. A method according to Claim 1, c h a r a c t e r i z e d in  
that said series of containers consists of stackable mugs (1) of a  
known kind, wherein a space (3) is formed between the mugs in a stack  
(2) of mugs (1); in that each said mug (1) is caused to contain the  
medicine to be ingested at a given time point; in that the mugs are  
20 enclosed in a casing (4), subsequent to having placed medicine in said  
mugs and stacking said mugs together; and in that said casing (4) is  
removed at a later stage and the mugs (1) inserted into a mug dis-  
pensing arrangement (6) of a kind which dispenses the mugs one at a  
time.
- 25 3. A method according to Claim 1, c h a r a c t e r i z e d in  
that said series of containers consists of a strip of sequentially  
located bags (101), in that each bag (101) is caused to contain the  
medicine to be ingested at a given time; and in that the strip of  
30 bags is inserted into a dispensing arrangement (106) intended to  
separate one bag at a time from the strip and to dispense said separat-  
ed bag.
- 35 4. A method according to Claim 1, 2 or 3, c h a r a c -  
t e r i z e d in that each container (1; 101), where appropriate, is  
caused to contain all of the medicines that a patient shall ingest at  
respective times.

- 5      5. A method according to Claim 1, 2, 3 or 4, c h a r a c -  
t e r i z e d by providing said casing (4) and said bags (101)  
respectively with a machine-readable code, preferably a bar code  
(7), containing information concerning the times at which the patient  
shall ingest the medicines.
- 10      6. A method according to Claim 5, c h a r a c t e r i z e d by  
programming the dispensing arrangement (10-15, 20; 104, 114) with  
said times, by reading said machine-readable code (7) with the aid of  
an optical reader (8; 108).
- 15      7. An apparatus for facilitating medication in which medicine cor-  
responding to the medicine ingestion of a patient at given respective  
times is placed in a series of containers which form mutually sequen-  
tial and mutually separated spaces, and in which each space contains  
the medicine to be ingested at a given time, c h a r a c -  
t e r i z e d in that the apparatus includes a dispensing arrangement  
(6; 106) of a kind in which one container (1; 101) at a time is  
dispensed from the series of containers;
- 20      and in that said dispensing arrangement is constructed to dispense  
one container (1; 101) at a time at given times under the influence  
of a clock and a drive means (10-15, 20; 104, 114).
- 25      8. An apparatus according to Claim 7, c h a r a c t e r i z e d in  
that said series of containers consists of stackable mugs (1) of  
known kind, such that a space (3) is formed between the mugs in a  
stack (2) of mugs (1), each said mug (1) containing the medicine to  
be ingested at a given time; and in that the mugs together with the  
medicine are embraced by a casing (4); and in that the dispensing  
30      arrangement is a mug dispensing arrangement (6) of a kind which  
dispenses one mug at a time, said mugs (1) being intended for insertion  
into the mug dispensing arrangement subsequent to having removed said  
casing.
- 35      9. An apparatus according to Claim 7, c h a r a c t e r i z e d in  
that said series of containers comprises a strip of mutually sequential  
bags (101), where each bag (101) contains the medicine to be ingested  
at a given time; and in that the dispensing arrangement (106) is

intended to receive the strip of bags (101) and to dispense one bag at a time by separating said bag from the strip with the aid of a separating device (113, 134, 115, 135) and dispensing the bag (101).

5 10. An apparatus according to Claim 8 or 9, c h a r a c -  
t e r i z e d in that the casing (4) or said bags (101) is/are  
provided with a machine-readable code, preferably a bar code (7)  
containing information relating to the times at which the patient  
shall ingest the medicines.

10 11. An apparatus according to Claim 10, c h a r a c t e r i z e d  
in that the control circuit (20) of said dispensing arrangement (6;  
106) is intended to be programmed with said times, by reading said  
machine-readable code (7) with the aid of an optical reader (8; 108),  
15 preferably a so-called pen reader or the like, belonging to said  
dispensing arrangement.

20 12. An apparatus according to Claim 7, 8, 9, 10 or 11, c h a r a c -  
t e r i z e d in that the dispensing arrangement is provided with a  
detecting means (25, 26; 125) intended to detect whether or not a  
dispensed mug or a dispensed bag has been removed from the dispensing  
arrangement by the patient; and in that the apparatus includes an  
alarm means (20, 28) which is intended to produce an alarm signal  
should the patient not remove a dispensed mug or bag within a given  
25 predetermined time.

Fig. 1

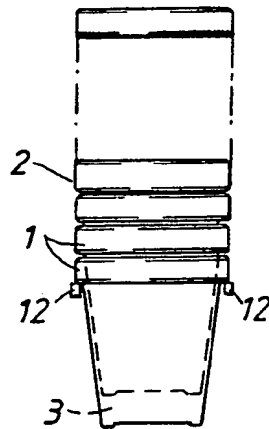


Fig. 2

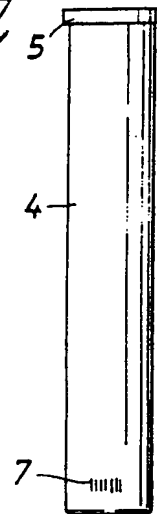


Fig. 6

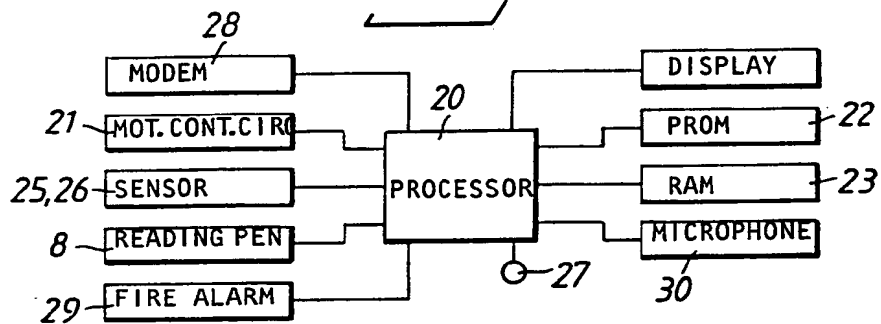
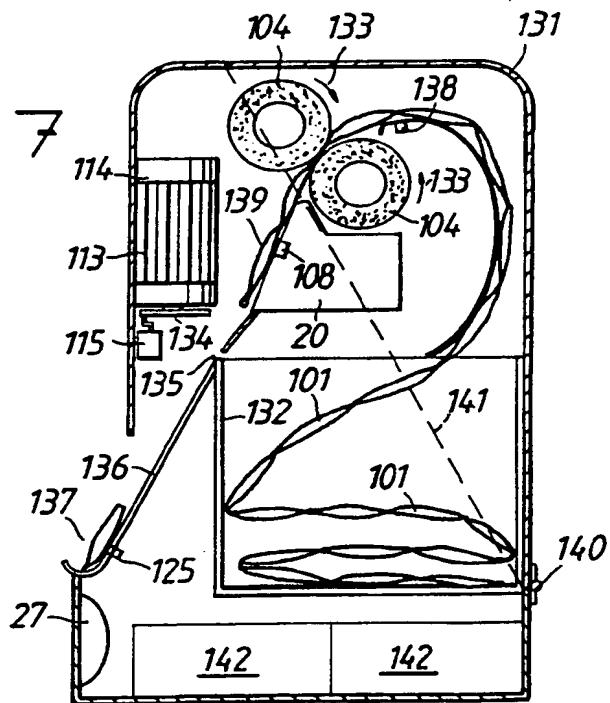


Fig. 7



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Fig. 3

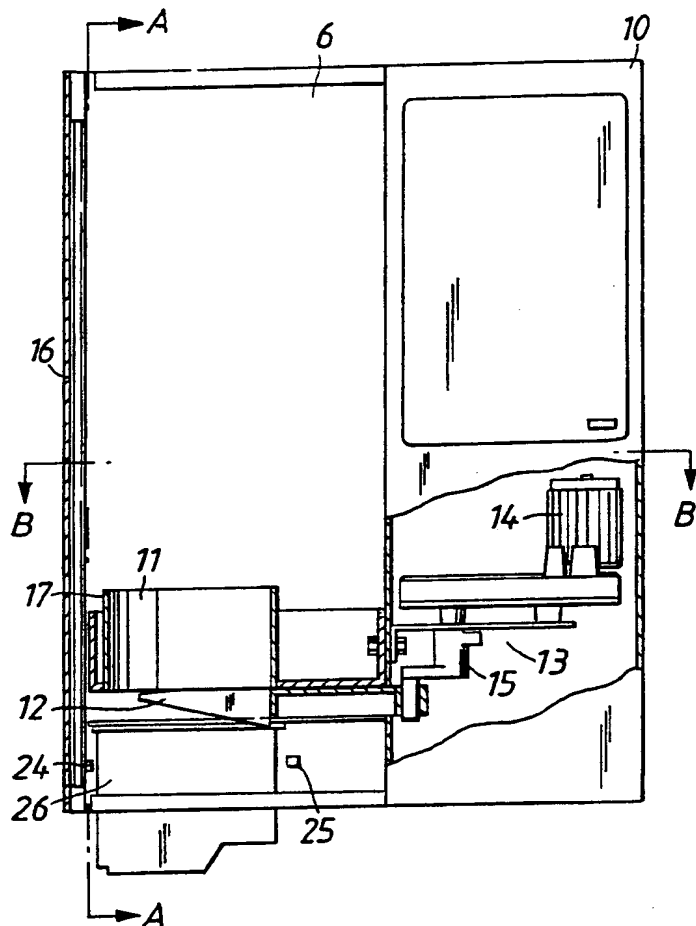


Fig. 4

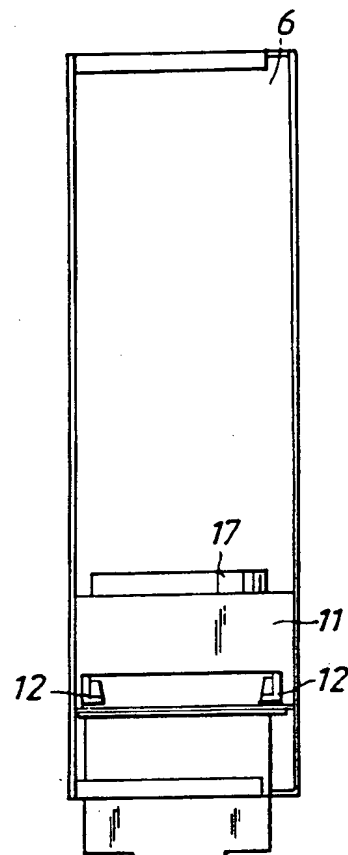
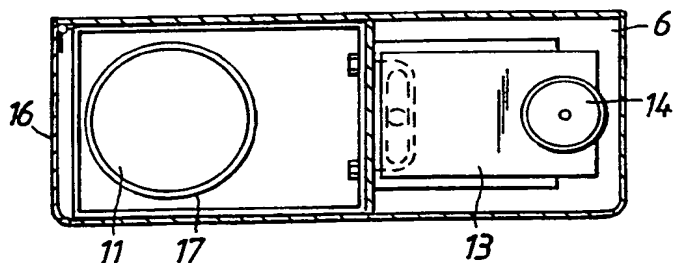


Fig. 5



**SUBSTITUTE**

# INTERNATIONAL SEARCH REPORT

International Application No PCT/SE 90/00641

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup> According to International Patent Classification (IPC) or to both National Classification and IPC <b>IPC5: A 61 J 1/03</b>																	
<b>II. FIELDS SEARCHED</b> <div style="text-align: right; margin-right: 100px;">Minimum Documentation Searched<sup>7</sup></div> <table style="width: 100%; border: none;"> <tr> <td style="width: 20%; border: none; vertical-align: top;"> <div style="border: 1px solid black; padding: 2px;">Classification System</div> </td> <td style="border: none; vertical-align: top;"> <div style="border: 1px solid black; padding: 2px;">Classification Symbols</div> </td> </tr> <tr> <td style="border: none; vertical-align: top;"> <div style="border: 1px solid black; padding: 2px;">IPC5</div> </td> <td style="border: none; vertical-align: top;"> <div style="border: 1px solid black; padding: 2px;">A 61 J; A 47 G</div> </td> </tr> </table> <div style="text-align: center; margin-top: 5px; font-size: small;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched<sup>8</sup></div>			<div style="border: 1px solid black; padding: 2px;">Classification System</div>	<div style="border: 1px solid black; padding: 2px;">Classification Symbols</div>	<div style="border: 1px solid black; padding: 2px;">IPC5</div>	<div style="border: 1px solid black; padding: 2px;">A 61 J; A 47 G</div>											
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<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b> <table style="width: 100%; border: none;"> <tr> <th style="width: 10%; border: none; text-align: left;">Category<sup>*</sup></th> <th style="width: 60%; border: none; text-align: left;">Citation of Document,<sup>11</sup> with indication, where appropriate, of the relevant passages<sup>12</sup></th> <th style="width: 30%; border: none; text-align: left;">Relevant to Claim No.<sup>13</sup></th> </tr> <tr> <td style="border: none; vertical-align: top;">Y</td> <td style="border: none; vertical-align: top;">SE, B, 424954 (MARS LTD) 23 August 1982, see the whole document --</td> <td style="border: none; vertical-align: top;">1-2,4-8, 11,12</td> </tr> <tr> <td style="border: none; vertical-align: top;">Y</td> <td style="border: none; vertical-align: top;">GB, A, 2198425 (PYXIS CORPORATION) 15 June 1988, see the whole document --</td> <td style="border: none; vertical-align: top;">1-2,4-8, 11,12</td> </tr> <tr> <td style="border: none; vertical-align: top;">Y</td> <td style="border: none; vertical-align: top;">EP, A3, 0191168 (SIMON, UDO) 20 August 1986, see the whole document --</td> <td style="border: none; vertical-align: top;">1-2,4-8, 11,12</td> </tr> <tr> <td style="border: none; vertical-align: top;">Y</td> <td style="border: none; vertical-align: top;">SE, A, 8801163-0 (COMPUMED AB) 30 September 1989, see the whole document --  -----</td> <td style="border: none; vertical-align: top;">1-2,4-8, 11,12</td> </tr> </table>			Category <sup>*</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>	Y	SE, B, 424954 (MARS LTD) 23 August 1982, see the whole document --	1-2,4-8, 11,12	Y	GB, A, 2198425 (PYXIS CORPORATION) 15 June 1988, see the whole document --	1-2,4-8, 11,12	Y	EP, A3, 0191168 (SIMON, UDO) 20 August 1986, see the whole document --	1-2,4-8, 11,12	Y	SE, A, 8801163-0 (COMPUMED AB) 30 September 1989, see the whole document --  -----	1-2,4-8, 11,12
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Y	EP, A3, 0191168 (SIMON, UDO) 20 August 1986, see the whole document --	1-2,4-8, 11,12															
Y	SE, A, 8801163-0 (COMPUMED AB) 30 September 1989, see the whole document --  -----	1-2,4-8, 11,12															
<div style="display: flex; justify-content: space-between; font-size: x-small;"> <div style="width: 45%;"> <p><b>* Special categories of cited documents: <sup>10</sup></b></p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&amp;" document member of the same patent family</p> </div> </div>																	
<b>IV. CERTIFICATION</b> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> <div style="border: 1px solid black; padding: 2px;">Date of the Actual Completion of the International Search</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">3rd December 1990</div> </td> <td style="width: 50%; border: none; vertical-align: top;"> <div style="border: 1px solid black; padding: 2px;">Date of Mailing of this International Search Report</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">1991 -01- 03</div> </td> </tr> <tr> <td style="border: none; vertical-align: top;"> <div style="border: 1px solid black; padding: 2px;">International Searching Authority</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">SWEDISH PATENT OFFICE</div> </td> <td style="border: none; vertical-align: top;"> <div style="border: 1px solid black; padding: 2px;">Signature of Authorized Officer</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">  Agneta Änggård </div> </td> </tr> </table>			<div style="border: 1px solid black; padding: 2px;">Date of the Actual Completion of the International Search</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">3rd December 1990</div>	<div style="border: 1px solid black; padding: 2px;">Date of Mailing of this International Search Report</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">1991 -01- 03</div>	<div style="border: 1px solid black; padding: 2px;">International Searching Authority</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">SWEDISH PATENT OFFICE</div>	<div style="border: 1px solid black; padding: 2px;">Signature of Authorized Officer</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">  Agneta Änggård </div>											
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**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO. PCT/SE 90/00641**

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
SE-B- 424954	82-08-23	AT-B- 367700	82-07-26
		AU-B- 512118	80-09-25
		AU-D- 2672577	79-01-11
		BE-A- 856321	77-12-30
		CA-A- 1085751	80-09-16
		CH-A- 615875	80-02-29
		DE-A-C- 2730085	78-01-12
		FR-A-B- 2356396	78-01-27
		GB-A- 1544223	79-04-19
		JP-C- 1288242	85-11-14
		JP-A- 53006176	78-01-20
		JP-B- 60001217	85-01-12
		LU-A- 77673	77-10-03
		NL-A- 7707407	78-01-04
		SE-A- 7707602	78-01-03
GB-A- 2198425	88-06-15	DE-A- 3738184	88-05-11
		JP-A- 63212361	88-09-05
		US-A- 4785969	88-11-22
EP-A3- 0191168	86-08-20	DE-A- 3530356	86-08-14
		DE-U- 8503564	85-05-15
		JP-A- 61185267	86-08-18
		US-A- 4660991	87-04-28
SE-A- 8801163-0	89-09-30	NONE	



Fig. 1

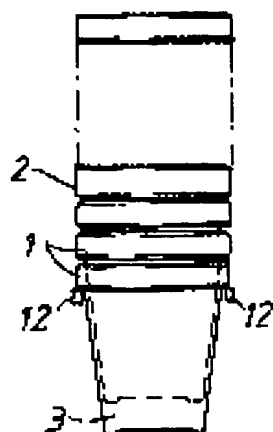


Fig. 2

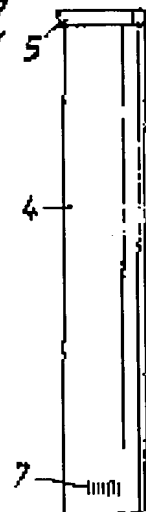


Fig. 6

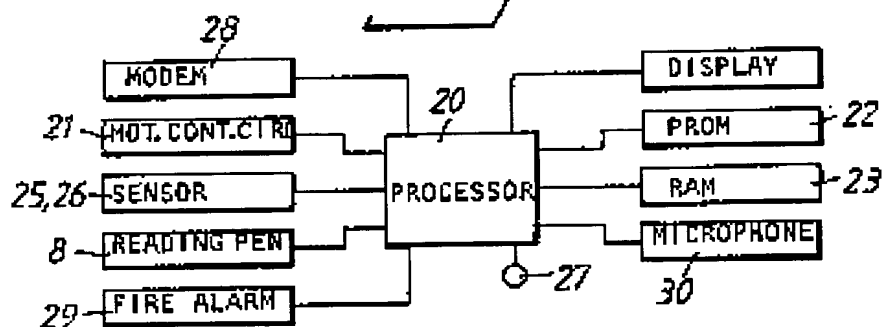
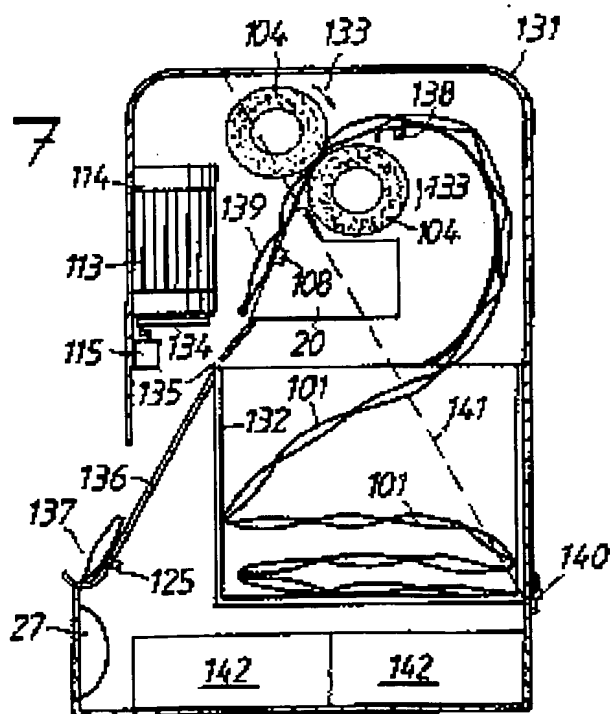


Fig. 7



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Fig. 3

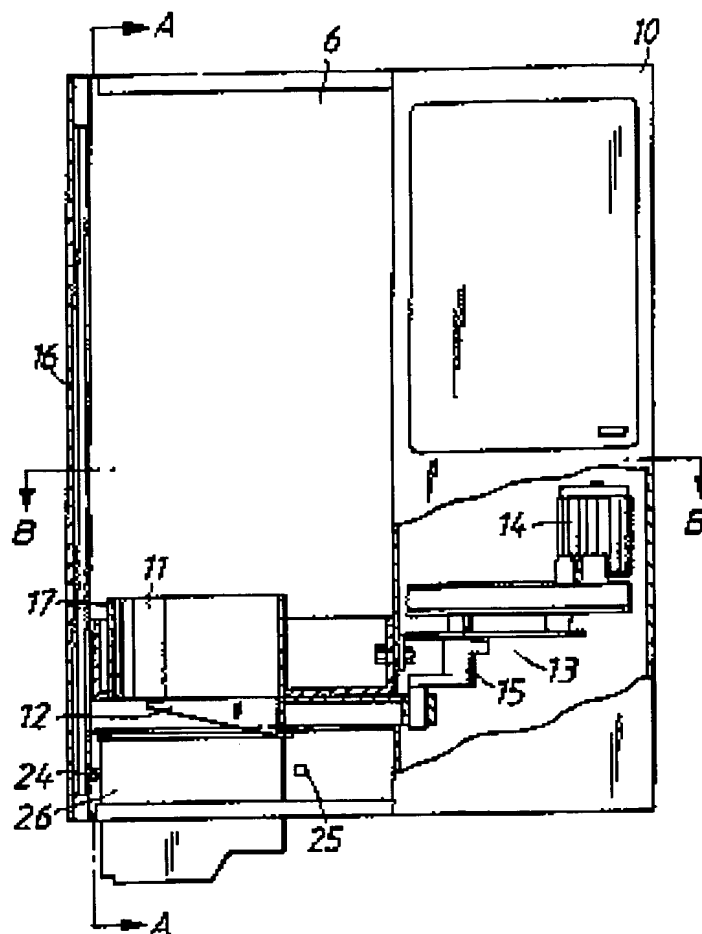
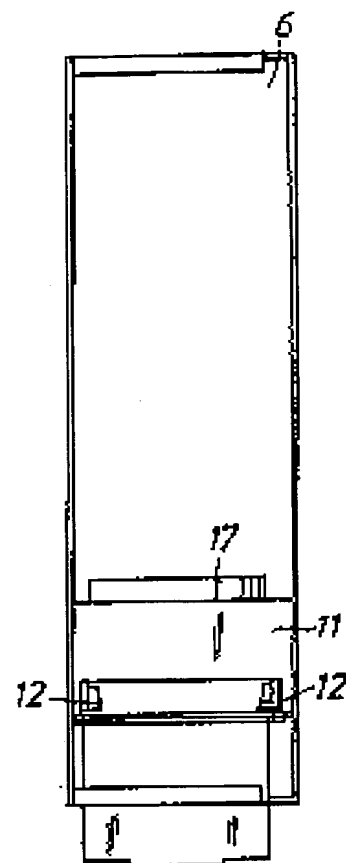
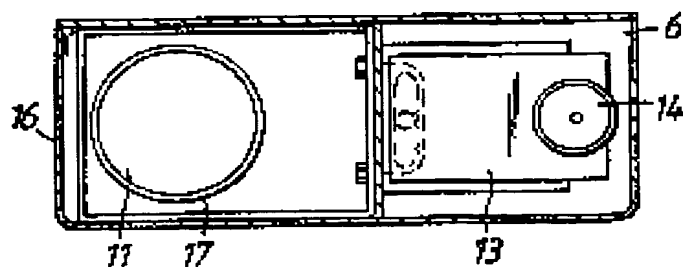


Fig. 4



*Fig. 5*



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